U.S. Department of Energy

National Energy Technology Laboratory

November 28, 2000

TO POTENTIAL OFFERORS AND OTHER INTERESTED PARTIES

PRELIMINARY PACKAGE

1. INTRODUCTION/INSTRUCTIONS

The preliminary objectives of Program Research and Development Announcement (PRDA) No. DE-RA26-01NT41093, entitled "Demonstration of Innovative and Improved Technologies for Size Reduction and Remote Material Handling," are being made available to provide an opportunity for potential offerors to review and become familiar with the requirements. Issuance of the PRDA is planned for mid to late December, with proposals being due approximately 30 days later. Potential offerors are invited to comment on the preliminary information provided herein.

The DOE will consider all timely comments submitted on the information contained herein, but makes no guarantee that any comment or group of comments will result in identifiable changes to the PRDA. Comments should be submitted to D. Denise Riggi via Internet at "driggi@netl.doe.gov", by mail, or telefax at (304) 285-4683, no later than December 15, 2000.

The DOE is under no obligation to respond to individual comments or questions, nor is it responsible for any costs associated with preparation of responses to this request or costs associated with future proposal preparation.

Offerors are cautioned that the information provided herein is preliminary and not all inclusive, and subject to change at the discretion of the DOE.

2. PRESOLICITATION SITE VISIT

A visit of the Hanford site is scheduled for December 13, 2000. The purpose of the site visit is to tour the area where the towers planned for hot demonstration/ deployment are stored. The visit is intended to allow potential offerors the opportunity to see the site where the cold demonstration will be conducted and view the towers planned for hot demonstration/ deployment. **In order to prepare for the site tour, prior to close of business (4:00 p.m. EST) on December 8, 2000, you are asked to provide the company name, address, telephone, telefax, and E-mail address, as well as the number and names of persons with citizenship, planning to attend the site tour by sending an E-mail notice to "driggi@netl.doe.gov." Directions to the site can be obtained by contacting**

Sharon Bailey via E-mail at "sharon.bailey@pnl.gov," (509) 375-2243 phone, or (509) 375-3614 fax.

3. OBJECTIVE/BACKGROUND

OBJECTIVES

The objective of this solicitation is to demonstrate technologies for the remote handling and size reduction of the long-length and oversized RH-TRU waste inventory at Hanford. Technologies that may be demonstrated include cutting of components, contamination control including containment and fixatives, decontamination, holding and manipulation, and assay equipment and processes appropriate for the RH waste stream. The size reduction of the equipment or other inventory should fit in a 55 gallon drum for final disposition.

Due to the type of work being done and environment in which it must be performed, equipment or processes that can be done remotely may have additional advantages. It is not necessary for proposed equipment to address all aspects of the size reduction work. In fact, it is anticipated that most procured items will address one specific aspect of the overall scope.

Size reduction technologies that have been considered deal mostly with cutting the components into smaller pieces. Examples are shears or saws to cut the structural steel or vessels into smaller pieces. Contamination control includes fixatives that could be used on both the outside of components or perhaps injected into the inside to reduce contamination spread during cutting operations. Decontamination methods that reduce personnel exposure or time required would be very useful. Contamination control might also include tents or other enclosure to keep contamination localized. Since the PUREX towers and many other TRU contaminated objects are large, holding components being cut or moving them before or after they are cut would be useful and perhaps necessary. The only means to move large objects currently is the overhead crane. Much improvement in planning and segregation could be realized if it were possible to do assay of the TRU material on the deck.

There are several ways that this size reduction effort could be improved. It is desirable to reduce the number of personnel required for the task. It is desirable to reduce worker exposure. It is desirable to reduce the volume of the material that is disposed of as TRU waste by improved packing factors or segregating TRU contaminated material from non-TRU contaminated material. It is desirable to increase throughput by doing the job faster. It is desirable to utilize commercially available equipment so as to reduce the need for specially developed equipment. It is desirable to minimize secondary waste generation. It is desirable to limit the potential for the spread of contamination.

This work will be performed in phases as follows:

Phase I - Proof of Principle Cold Demonstration

Phase II - Acquisition and Deployment

BACKGROUND

The United States Department of Energy's Hanford Site, near Richland, Washington, has a number of well-defined needs for robust, remote material handling systems for the disposal of significant waste streams critical to the Hanford mission. Enforceable Consent Agreement milestones are tied to these waste streams, and continued long-term storage is not an option.

A current forecast indicates that more than 25,000 cubic meters of LLW M LLE (1200 containers) and 1100 cubic meters of TRU LLE will require processing and disposal. In addition to this, there is a forecasted non-LLE volume of 3800 cubic meters of remote handled (RH) MLLW, and 1700 cubic meters of RH TRUW, as well as 1700 cubic meters of failed equipment presently stored in the PUREX tunnels that may need to be removed and processed for disposal.

The first waste stream components to be tackled under this program are two PUREX towers located on the canyon deck of T-plant. While these two towers are the initial items of the long-length and oversized RH-TRU waste inventory of to be size reduced, any equipment and processes procured under this program are expected to be generally applicable to many items. Other systems to be sized reduced later also include process vessels and significant amounts of piping. The towers are representative of the materials of construction, contamination levels, and component sizes that comprise many other items in the long-length and oversized RH-TRU waste inventory.

Size reduction of the PUREX towers will be carried out on the canyon deck at T-plant. It is very likely that most future size reduction of long-length and oversized RH-TRU waste inventory will also be conducted at the same location. The constraints imposed on the size reduction activities for the PUREX towers will be similar to later activities.

Tower Descriptions

The PUREX T-L2 and T-J4 Towers are currently stored in the T-Plant Canyon, and have been identified as containing fissile isotopes. Each tower consists of a frame constructed of structural steel supporting a stainless steel column. Typical structural steel members are six and eight-inch wide flange beams and two to six-inch angles. The largest components of the stainless steel columns are long sections of seven to eight-inch diameter tubing with quarter inch walls. Additional column components include smaller diameter schedule 40 piping, and plates. Inside the large diameter tubing are numerous plates and tie rods. Overall dimensions of tower T-L2 are thirty-one feet long, eight feet tall, and six feet wide with a carbon steel frame weighing approximately 5400 pounds and a stainless steel column of approximately 1900 pounds. Overall dimensions of tower T-J4 are twenty-two feet long, ten feet tall, and eight feet wide with a carbon steel frame weighing approximately 3700 pounds and a stainless steel column of

approximately 1700 pounds. Both towers were originally oriented with the long dimension vertical but have been laid on their sides for storage on the deck. It is anticipated the towers will be size reduced in their current orientations.

Figures 1 and 2 show two views of T-J4 and the canyon deck while Figure 3 shows T-L2 as seen from deck level.

Characterization of the towers for plutonium concentration indicates the T-L2 column contains approximately 18 grams of fissile material while the T-J4 column contains approximately 6.4 grams of fissile material. The carbon steel frames were originally painted when fabricated in the early 1950's. This paint is now flaking off. In addition, the frames currently have very high levels of alpha contamination (up to 1 million dpm).

Figure 1 PUREX Tower T-J4 From Deck Level

Figure 2 PUREX Tower T-J4 Viewed From Overhead Crane

Figure 3 Tower T-L2 on T-Plant Canyon Deck

Canyon Deck Description

While Phase I, Proof of Principle, cold demonstrations will not be conducted on the canyon deck at T-Plant, any equipment or processes must be compatible with use on the canyon deck. The canyon building is approximately 800 feet long. The deck is approximately 40 feet wide and is approximately 32 feet to the bottom of the crane hook. The deck is a radiation and contamination zone. Remote operation of equipment from locations in other parts of the building is possible and perhaps preferred. However, there are a very limited number of penetrations between the canyon deck and other nearby areas that are outside the radiation and contamination zone.

The entire air space inside the canyon building is connected. Any activities that are conducted in one place on the deck that generates airborne contamination could result in the spread of contamination to other parts of the canyon.

Personnel on the canyon deck are required to wear PPE. Normal access to the canyon deck requires two pair of coveralls, shoe covers, rubber boots, two pair of gloves, hood, and respiratory protection. PPE tends to reduce worker mobility and restrict dexterity. The temperature on the deck can be very cool during winter months and hot during summer months.

The canyon deck is visible in Figure 2. Covers for below deck cells are visible on the right side of the canyon deck in Figure 2. The cells are 20 feet apart and each has four cover blocks. Typical lifting bales for the cover blocks are visible very near the numbers 1 and 2 in the upper center of Figure 2. On the left side of the deck are another series of cover blocks covering a hot pipe trench. The lifting bales for these blocks are also visible in Figure 2. Lifting bales are also visible in the other figures. These lifting bales are fixtures of the canyon deck that must be considering in using any equipment on the deck. In addition to the lifting bales, the canyon deck has many other obstructions. In addition to the PUREX towers, the deck is being used for storage of other items.

The cover blocks on the cells are not watertight. Any liquids that might be used in the size reduction tasks might leak through the cracks and enter the cells below and end up in the building drain line. The outflow from the drain line is collected inside the canyon. However, it is undesirable to have any liquids from size reduction activities from entering the cells below.

Relatively large equipment can be brought onto the canyon deck. This is possible using a railcar tunnel or truck entrance. However, normal access by personnel or equipment is though man doors. Electrical power is available on the canyon deck. However, other utilities are generally not available on the deck. For some equipment, remote operation may be desirable. However, there are a very limited number of penetrations through the canyon walls.

4. GENERAL APPROACH

The statement of work will be set up in two phases: Phase I is for cold demonstration of selected technologies. Phase II is for acquisition and hot deployment of desired technologies successfully completing Phase I.

Phase I will be performed at the Hanford site, with simulated waste material. DOE has no plans to provide any hazardous materials to the offerors to process. If the offeror's process generates hazardous materials in Phase I, the offeror, not DOE, will be responsible for disposal of waste generated during Phase I.

In Phase II, selected technology(ies) will be purchased for hot demonstration and deployed for size reduction activities at T-Plant at the Hanford site. Items to be size reduced in Phase II are the Purex towers described in the Objectives and Background, or a site-selected alternate.

Phase I and II – Requirements

The candidate systems shall be designed to meet these requirements:

- The system shall minimize the spread of radio-nuclides.
- The system shall reduce the size of the long-length items to fit into 55 gallon drums for final disposition.

- The system shall demonstrate disposal paths for any secondary non-transuranic waste generated by the process and shall minimize the generation of such waste.
- The system shall require minimal off gas control processes and monitoring instruments.
- Decontamination systems shall attain a minimal decontamination factor of 100.
- Systems shall reduce worker exposure to radiation or other hazards, reduce cost, reduce processing time or provide other benefits over the current baseline size reduction approach.
- Systems shall operate on the canyon deck.

If a technology is successfully demonstrated in Phase I, and it meets the needs of the T-plant user, the technology may be purchased in Phase II for use on the canyon deck.

Phase I – Proof of Principle Cold Demonstration - Approach

In this phase, size reduction, material handling, decontamination, contamination control or other technologies that may be applicable to the Purex tower size reduction task or other large-scale size reduction tasks, will be investigated. For all proposed technologies, the Offeror will plan and conduct a Proof of Principle Cold Demonstration at the Hanford Site. This demonstration should illustrate the application of the offeror's technology to the size reduction problem at Hanford. Specifically, the offeror will demonstrate, on a non-radioactive sample (cold demonstration), size reduction, material handling, decontamination, contamination control or other applicable technologies. The technology will be applied to the non-radioactive Purex tower located at U-Plant or a buyer-approved alternate test article. Technologies that reduce cost, personnel exposure to radiation and other hazards, or reduce processing time will be considered for Phase II (purchase of equipment).

Phase II – Acquisition and Deployment - Approach

In Phase II, the selected technologies successfully demonstrated in Phase I, will be purchased. The contractor will provide operator training and technical assistance for the hot demonstration of the technology to the Purex tower size reduction task or another site-selected size reduction task.

6. AVAILABILITY OF FUNDS

Reference FAR 52.232-18. Funds are not currently available for this solicitation; the Government's obligation under any contract awarded is contingent upon the availability of appropriated FY2001 funds.